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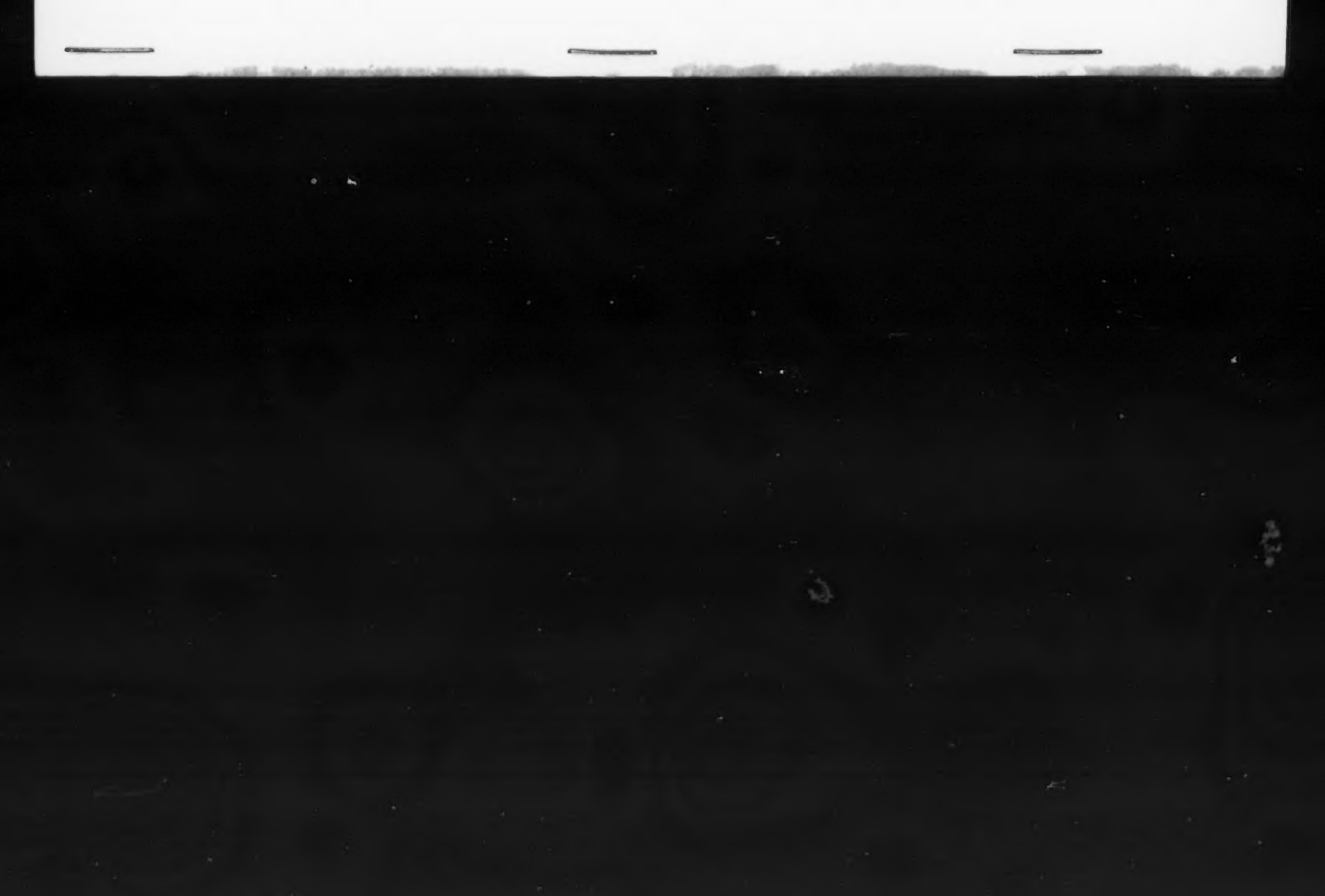

ENTOMOLOGICAL NEWS

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At what Point does Insect Attack become Damage?

By W. DWIGHT PIERCE, Biological Abstracts, Philadelphia, Pa.

Two recent articles passing before the writer for abstract have called to mind other personal observations, and bring up an important question in economic entomology.

Is all insect attack to be computed as assessable damage? If not at what point does it become assessable? Is control work warranted when the damage is below that point?

It is well known to all horticulturists that many kinds of trees put on many times more blossoms than they can possibly set into fruit, and bring to maturity. The entire skeletal structure of the plant would require strengthening to carry the weight of 100% fruiting. As it is, many fruit trees have to be heavily thinned of fruit in order to relieve the overloaded branches, and also to obtain standard size fruit.

There is a weight limit of fruit that can be held by a tree, due to skeletal structure.

The weight limit of fruit that can be matured, is controlled by the nutriment in the soil available to the plant, and the available water. In periods of drought the plant cannot mature as much fruit as in periods of abundant moisture.

To meet such situations the plant produces its full quota of flowers, so that there may be a sufficient proportion fertilized. Then if too many are fertilized, the plant must drop some.

It becomes necessary for the economic entomologist who is attempting to compute damage, to know the normal capacity to fruit or produce, under the existing conditions, and to determine the approximate normal shedding or fall, by which the plant adjusts itself. Then, to that should be added the amount of thinning advisable to obtain the best quantity of best quality fruit of standard size. It seems to the writer that any insect

attack which is below the sum total of natural fall, and necessary thinning is not to be assessed as damage.

The real damage comes when the insects reduce the yield below the normal productive capacity of the crop.

Thus, we may have a 30% insect injury in one grove and none in another, and yet find that both groves have set a 12% crop. Then the uninfested has shed 88% of its bloom, and we can consider that there was no assessable insect damage.

While in the Philippines the writer was investigating dead heart borers of sugar cane. Some of the planters insisted that the borers were doing no real harm, because the stools of cane would replace all injured shoots by new shoots. They said that the cane could only mature so many stalks per stool, and that many would naturally have to be starved out, so why worry when the insects did the thinning?

It seemed to the writer that there was a fallacy involved. It was quite true that in most fields the average number of canes was finally the same, no matter what the early hisory of dead heart borers. But cane which had no borer pruning was not delayed by the necessity of replacing one to three months old shoots in order to make its full capacity. The important question here was one of time. Infested cane took two to three months longer to mature when there was a large percentage of pruning of the young shoots. By actual counts the cane developed an average of 3 shoots per stool in 3 months, but because of borers it required at least 5 months to set enough shoots to net 3 per stool. If the normal time for a crop was 11 to 12 months, and a badly attacked crop required 15 months to mature, then in 5 years, the unattacked cane would produce 5 crops, but the badly attacked cane would produce but 4 crops. This was in a section where cane was planted and harvested at all months in the year. But in a section where the cane must be harvested before a certain time, dead heart attack becomes very serious. In the case of sugar cane attack by dead-heart borers I figured that all damage was assessable in terms of time and money. In fact there were fields where the damage was so great that two and three replantings were necessary. The

weevil borer, *Trochorhopalus strangulatus*, attacks the mature canes, that is, after the crop has adjusted itself to the normal stalk capacity of the field.

Actual measurements of bored canes, and analyses of sugar proved beyond a doubt that the length and diameter of bored canes was less, and that the purity and sugar yield was reduced. Therefore all injury whatsoever by the stalk borer was to be assessed as damage, and this could be figured in sugar and money.

These points above mentioned are shown in detail in my bulletins issued by Victorias Milling Co., Occidental Negros.

An outbreak of *Laphygma exempta* swept over the cane fields, and in two or three days the fields were stripped to the ground. It looked like a major calamity, but a planter told me that he was always glad to have the worms devastate his crop, because he got a better crop. It actually happened that the cane shot up a new stand of shoots and grew very rapidly, with the result that it caught up in height with surrounding undamaged cane, and the actual assessable damage was incomputable.

The cotton crop never matures 100% of the bloom, but always shows more or less natural shedding, which has so far never been attributable to other than physiological causes. To obtain true boll weevil damage we must subtract the normal shedding from the total drop.

To get a good peach or apple crop the grower must thin, sometimes a very large proportion of the young fruit. If insect injury does not take more than this thinning would, then it is not assessable as damage.

Mr. T. Aristov (1932) in the Bull. Plant Protection of the Lenin Acad. Agr. Sci. U. S. S. R., ser. 1: Entomology, No. 6, pp. 6-30, shows that no more than 1/5 of the apple blossoms formed in Russia ever develop into fruit, and he believes that injury caused by the apple-blossom weevil, *Anthonomus pomorum* only has economic importance when this favorable balance is destroyed, which occurs comparatively rarely. Infestation up to 51% of the blossoms shows no effect upon the final yield.

He holds that the weevil has an economic importance, 1. when the percentage of injuries caused by the weevil is higher than the percentage of the natural loss (i.e., failure of blossoms to develop into fruit), or physiological dropping; 2. when the percentage of the injuries equals the percentage of the natural loss and when there are other negative factors which hinder a natural sitting; and 3. when the percentage of the injuries is lower than that of the natural loss, but the total of negative factors preventing a normal setting is very high and the probability of fruit formation depends on a large number of blossoms.

G. H. Corbett (1931) in Dept. Agr. Straits Settlements and Federated Malay States, Scientific Series, no. 8, pp. 1-14, reports on *Tirathaba rufivena*, the Greater Cocoanut Spike Moth, and finds that the cocoanut palm appears capable of maturing a certain number of flowers and to drop those which it cannot sustain. The largest normal fall of female flowers occurs in the fifth week, while *Tirathaba* does its principal damage in the second week. During the interval between the time of maximum bored female flowers and maximum dropped flowers, the palm appears to be continually making adjustments, and instead of dropping other flowers, drops the *Tirathaba* bored flowers. When *Tirathaba* injury was reduced the drop from other causes rose, so that the end results were the same. Corbett suggests that the percentage of bored flowers would have to reach the high percentage of 58% before this insect could be considered responsible for reducing the number of nuts.

These two estimates are strikingly close, and it will be interesting to have others look at their respective problems and assess the damage due to insects as that which reduces yield below normal. Perhaps we get unduly excited sometimes over insect attack, and forget the normal shedding or the normal recuperative powers of the plant.

Nature has its checks and balances, and I have often thought that if we were to let down on the insecticides which kill both insects and parasites, and often ultimately injure the plant life; and do more toward building up natural agencies of control, we would in the long run have a far saner program.

Field Notes on Texas Orthoptera.

By F. B. Isely, Trinity University, Waxahachie, Texas.

The last three days of August, 1932, afforded the writer an opportunity to make a "sampling check" of the late summer diurnal Orthoptera of northwestern Texas. Entering the state near the northeast corner of the pan-handle our trip carried us west through Follett, south through Lipscomb, Canadian (via highway 4), Shamrock, Childress, and southeast (via highway 5) thru Vernon and Iowa Park.

Eleven collecting stations representing habitat differences were selected chiefly on the basis of topography, soil, and vegetation. It is a well known fact that "highway stations" often leave untouched unique and virgin habitats. Our limited time, however, did not permit a more thorough method.

Weather conditions were not always favorable for the best work as high winds and several showers interfered with our studies. In the field work I was ably assisted by two collectors (Mrs. F. B. Isely and Frederick B. Isely, Jr.).

Six hundred and sixty-six of the collected specimens were checked and sixty-two species are here reported. Specimens of most of the species taken are in the Hebard Collection and the writer is much indebted to Mr. Morgan Hebard for determinations.

The only important paper * dealing with the Orthoptera of this area was based on a most interesting nine day reconnoisance survey made by Dr. A. P. Morse in August, 1905. Morse started at Denison, Texas; working northwest he studied in five Red river and two panhandle counties.

A very brief sketch of our collecting stations is given.

1. Three miles east of Follett, VIII, 29, 1932. Rolling upland prairie tract and adjacent ravines. Vegetation, bunchgrass (*Andropogon*), mixed weeds, and some bare ground.
2. Three miles west of Follett, VIII, 29, 1932. Level buffalo-grass (*Bulbilis*) pasture and adjacent weedy flat and slough.
3. One mile north of Lipscomb, VIII, 29, 1932. Bare clay

* Further Research on North American Acrididae, Carnegie Institution of Washington, Publication No. 68.

hillside and adjacent rough upland prairie. The first three stations were all in Lipscomb county. Altitude from 2500-3500 feet.

4. Two miles north of Canadian, VIII, 29, 1932. Canadian river sandy soil pasture land covered in collecting area chiefly with scattered plum bushes, johnston-grass (*Holcus*) and coarse weeds.

5. Three miles south of Canadian, VIII, 30, 1932. A "dry creek" valley and adjacent prairie hillsides. In the flat, coarse weeds and short grasses.

6. Seven miles south of Canadian at the top of "cap-rock," VIII, 30, 1932. Very rough broken upland, bare rocky ravines and near-by prairie tract. Stations 4, 5 and 6 were in Hemphill county. Average altitude 2700 feet.

7. South of Shamrock in Collingsworth county, altitude 1,950 feet, VIII, 30, 1932. Rough topography, over grazed "red-bed" pasture land. We collected among mixed weeds and grasses.

8. Two miles north of Childress in Red river valley, VIII, 30, 1932. Sandy soil, open mesquite and ground cover of broom weed (*Amphiachyris*), Childress county, altitude 1,875 feet.

9. Eight miles northwest of Vernon, VIII, 31, 1932. A "vernon" clay soil mesquite flat cover with broom weeds (*Amphiachyris*).

10. Near Vernon, VIII, 31, 1932. Pease river sandy soil cover with tall grasses (*Andropogon*) and weeds. Station 9 and 10 are in Wilbarger county, elevations about 1,200 feet.

11. Seven miles northwest of Iowa Park, Wichita county, 9,000-1,100 feet altitude, VIII, 31, 1932. Open mesquite flat, the grass cover was very different from stations 8 and 9, being a soft growth of curly mesquite-grass (*Hilaria*).

Of the sixty-two species listed below only twenty-two, or a third, are represented by ten or more individuals in the checking. This would suggest that these are the common August species at the places where collecting was done. As is usually the case in "sampling" collecting, the collector is on the lookout for species not yet taken and the commoner "known at sight" species are passed by. The number of juveniles was relatively small as would be expected in late August.

With the list of species the number of individuals checked for the species and the stations where they were taken is indicated.

LITANEUTRIA MINOR (Scudder) 2♀, sta. 5 & 7.
STAGMOMANTIS CAROLINA (Johansson) 2♀, sta. 1 & 10.
DIAPHEROMERA V. VELIEI Walsh 2♂, 2 juv. f, sta. 10.
PARATETTIX C. CUCULLATUS (Burmeister) 2♀, sta. 1.
TETTIGIDEA L. LATERALIS (Say) 1♀, sta. 1.
MERMIRIA NEOMEXICANA (Thomas) 18♂, 13♀, sta. 1-3, 5, 7, 10.
M. M. MACULIPENNIS Bruner 10♂, 11♀, sta. 1, 2, 4, 7, 9-10.
SYRBULA ADMIRABILIS (Uhler) 15♂, 17♀, 6 juv. ♀, sta. 1-2, 4-7, 9-10.
OPEIA OBSCURA (Thomas) 19♂, 43♀, sta. 1-3, 10.
AMPHITORNUS COLORADUS (Thomas) 1♀, sta. 2.
PHILIBOSTROMA QUADRIMACULATUM Thomas 7♂, 9f, 6 juv. ♀, sta. 1-3, 7, 11.
ORPHULELLA SPECIOSA (Scudder) 1♂, sta. 1.
AGENEOTETTIX DEORUM (Scudder) 39♂, 51♀, sta. 1-3, 5-7, 9, 11.
BOOPEDON NUBILUM (Say) 2♀, sta. 11.
AULOCARA ELLIOTTI (Thomas) 1♀, sta. 7.
ARPHIA XANTHOPTERA (Burmeister) 1♂, sta. 1.
A. PSEUDONIETANA (Thomas) 3♂, 1♀, sta. 2.
CHORTOPHAGA VIRIDIFASCIATA (DeGeer) 1♂, 2 juv. ♀, sta. 1 & 11.
ENCOPTOLOPHUS COSTALIS (Scudder) 1♀, sta. 5.
HIPPISCUS RUGOSUS (Scudder) 6♂, 9♀, sta. 1-5, 9, 11.
PARDALOPHORA SAUSSUREI (Scudder) 1♂, 1♀, sta. 4.
DISSOSTEIRA LONGIPENNIS (Thomas) 1♂, 1♀, sta. 2.
SPHARAGEMON COLLARE CRISTATUM Scudder 11♂, 22♀, sta. 1, 3-5, 6, 7, 10.
S. EQUALE (Say) 2♂, 4♀, sta. 8-10.
TRACHYRHACHIS K. KIOWA (Thomas) 1♂, sta. 2.
T. K. FUSCIFRONS (Stal) 3♂, 7♀, sta. 3, 5, 11.
MESTOBREGMA P. PLATTEI (Thomas) 6♀, sta. 3.
PSINIDIA F. FENESTRALIS Stal. 1♀, sta. 4.
TRIMEROTROPIS PISTRINARIA Saussure 5♂, 6♀, sta. 6-8, 11.
HADROTETTIX TRIFASCIATUS (Say) 9♂, 25♀, sta. 1-9.
CIRCOTETTIX N. NIGRAFASCIATUS Beamer 3♂, 2♀, sta. 6.
BRACHYSTOLA MAGNA (Girard) 1♀, sta. 5.
PAROPOMALA WYOMINGENSIS (Thomas) 4♀, sta. 1 & 6.
SCHISTOCERCA AMERICANA (Drury) 1♂, 2♀, sta. 10.
S. LINEATA Scudder 2♂, 3♀, sta. 4-5.
S. OBSCURA (Fabricius) 1♀, sta. 5.
HYPOCHLORA ALBA (Dodge) 1♂, 2♀, sta. 11.
CAMPYLACANTHA O. OLIVACEA (Scudder) 3♂, 6♀, sta. 1, 2, 7.
HESPEROTETTIX V. VIRIDIS (Thomas) 6♂, 12♀, sta. 1, 3, 6, 8, 9.
H. SPECIOSUS (Scudder) 2♂, 9♀, sta. 1, 2, 4, 7.

MELANOPLUS GLAUCIPES (Scudder) 1 ♂, 3 ♀, sta. 9 & 11.
M. DIFFERENTIALIS (Thomas) 3 ♂, 10 ♀, sta. 2, 9, 10.
M. BIVITTATUS (Say) 1 ♂, 1 ♀, sta. 10.
M. REGALIS (Dodge) 1 ♂, sta. 9.
M. LAKINUS (Scudder) 1 ♂, 2 ♀, sta. 9.
M. M. MEXICANUS (Saussure) 3 ♂, 4 ♀, sta. 1, 2, 8, 9.
M. K. KEELERI (Thomas) 1 ♂, sta. 6.
M. PACKARDII Scudder 18 ♂, 20 ♀, sta. 1, 3, 5-7, 9.
M. PLEBEJUS (Stal) 1 ♂, sta. 11.
M. F. FOEDUS Scudder 2 ♂, 1 ♀, sta. 3, 6.
M. F. FLUVIATILIS Bruner 3 ♂, 2 ♀, sta. 10.
M. BISPINOSUS Scudder 10 ♂, 7 ♀, Sta. 1, 3, 5, 7, 10.
M. E. ELONGATIS Scudder 30 ♂, 34 ♀, sta. 1, 3-10.
M. B. BOWDITCHI Scudder 1 ♀, sta. 6.
M. P. PONDEROSA (Scudder) 4 ♂, 2 ♀, sta. 9.
PHOETALIOTES NEBRASCENSIS (Thomas) 7 ♂, 5 ♀, 3 juv., sta. 1, 3, 6.
DACTYLOTUM PICTUM (Thomas) 6 ♂, 6 ♀, sta. 1, 2, 5-7.
ORCHELIMUM SILVATICUM McNeill 1 ♂.
CONOCEPHALUS STRICTUS (Scudder) 2 ♂, 2 ♀, sta. 11.
REHNIA VICTORIAE Caudell 2 ♀, sta. 10 & 11.
GRYLLUS ASSIMILIS Fabricius 1 ♂ sta. 3.
OECANTHUS NIGRICORNIS F. Walker 1 ♀, sta. 10.

The Osborn Collections of Insects.

Dr. Herbert Osborn, of the Ohio State University, recently retired as Professor Emeritus, has donated his collections of Hemiptera to the University, and the Trustees, in accepting the gift, have provided a Curator of Insect Collections and additional housing equipment in the department of Zoology and Entomology to ensure permanent care and preservation of these and other collections belonging to the institution. Mr. J. N. Knull, formerly with the Bureau of Plant Industry of Pennsylvania and an expert in the care of insect collections, has been secured as Curator and will assume his duties in January. The Osborn collections are extensive and contain a large number of types of the species described in his scientific papers.

Types of Insects in the United States National Museum.

Each species represented by type material is recorded under a serial number in the type-books of the Division of Insects. The number passed 50,000 on September 12, 1933. To show the rate of growth in recent years, it may be added that the number passed 25,000 on October 31, 1921.

J. M. ALDRICH, Associate Curator, Division of Insects.

Five New Species of Coleoptera (Cleridae, Elateridae, Buprestidae and Cerambycidae).

By JOSEF N. KNULL, Hummelstown, Pennsylvania.

Cymatodera neomexicana n. sp. (Cleridae.)

Light brown above and below, with a median transverse yellow band.

Head finely punctured; moderately pubescent; eyes not prominent; antennae reaching humeral angles of elytra, joints two to ten sub-equal in length, joints five to ten feebly serrate, eleventh joint about twice the length of tenth.

Pronotum nearly twice as long as wide, wider in front than at base, widest in middle, ante-scutellar impression small with a feeble tubercle each side; surface very finely and densely punctured; moderately clothed with long and short pubescence. Scutellum small, pubescent.

Elytra nearly twice as wide as base of pronotum; sides sub-parallel, feebly divergent posteriorly, apices rounded to suture; punctures coarse, deep, closely placed, gradually decreasing in size posteriorly, becoming obsolete near apices; intervals flat, punctures minute; moderately clothed with hairs of varied lengths; wings present.

Body beneath shining, sparsely pubescent; punctures of abdomen fine; legs clothed with slender hairs of varied lengths.

Length 8 mm.; width 2.5 mm.

♂.—Last ventral segment broader than the last dorsal, the sides of the former reflexed partly enclosing the latter; fifth ventral deeply emarginate; sixth ventral about as long as broad; sides sub-parallel, the angles produced into short spines, between which the apex is bisinuately emarginate, a longitudinal carina in middle and an oblique one on each side, running to points; fifth dorsal segment deeply emarginate, narrower than corresponding ventral.

Type, a male labeled NEW MEXICO, in the collection of the writer.

According to Wolcott's key[1] this species would come under the *knausi-morosa* group, near *longula* Wolcott.

Limonius ovatus n. sp. (Elateridae.)

Moderately robust, shining dark brown in color, beneath slightly lighter.

Head with front convex; surface coarsely punctured; clypeal

[1] A. B. Wolcott, Proc. U. S. Nat. Mus. 59: 269-290, 1921.

margin truncate, slightly emarginate in middle; second joint of antennae cylindrical, nearly twice as long as wide, third joint cylindrical, one and one-half times length of second, fourth and following joints serrate slightly longer than third.

Pronotum longer than wide, broader at base than at apex; sides nearly parallel, broadly rounded anteriorly, slightly sinuate near hind angles; prehumeral carinae distinct; surface coarsely punctured, clothed with rather long suberect pubescence. Scutellum nearly round, pubescent.

Elytra with sides nearly parallel in basal two-thirds, broadly rounded to rounded apices; surface striato-punctate, punctures small; interspaces more finely punctured; clothed with short suberect pubescence.

Abdomen finely punctured, pubescence short; prosternal sutures distinctly grooved in front.

Length 10 mm.; width 2.5 mm.

Described from a specimen labeled Laguna, CALIFORNIA, August 8, in writer's collection. A *paratype* from the same locality labeled August 23.

According to Van Dyke's key[2] this species would run to *L. griseus* Beauv. It can readily be separated by the smaller size, more slender form and lack of dense pubescence.

Athous paradisus n. sp. (Elateridae.)

Dark brown, head and thorax piceous, resembling the dark form of *A. pallidipennis* Mann., form more slender.

Head densely coarsely punctured, front deeply impressed, with prominent clypeal margin; clothed with dense pubescence which is longer in depression; antennae reaching to apical third of elytra, second joint small, about as long as broad, third joint nearly three times as long as second, fourth joint length of third.

Pronotum longer than wide, wider at base than at apex; hind angles short, broad and ear-like; sides broadly rounded anteriorly, subparallel in middle, slightly sinuate toward base; hind angles without carinae; a lateral oblique depression on each side in middle; surface finely densely punctured, pubescence dense. Scutellum nearly round, pubescent.

Elytra with sides parallel on basal two-thirds, then broadly rounded to rounded apices; surface striato-punctate, intervals finely punctured; clothed with short suberect pubescence.

Abdomen finely densely punctured; first joint of anterior

[2] E. C. Van Dyke, Proc. Calif. Acad. Sci., 20, No. 9, pp. 291-456, 1932.

tarsi as long as two following joints, first joint of middle and posterior tarsi longer than the two following joints; joints of tarsi on all feet decreasing in length from first to fourth, anterior tarsi with second joint nearly cylindrical, third but slightly lobed beneath, fourth somewhat more elongate.

Length 10 mm.; width 3 mm.

Described from a male specimen labeled Paradise Park, White Mountains, ARIZONA, July 15, D. K. Duncan collector. *Type* and *paratypes* from the same locality in writer's collection.

According to VanDyke's key [2] the species runs to *A. pallidipennis* Mann., but it is smaller and less robust. There is an oblique carina near the apex on each lateral lobe of the aedeagus, whereas in *A. pallidipennis* Mann., it is more parallel to the sides.

Agrilus arizonus n. sp. (Buprestidae.)

Form robust, bronze, beneath more shining than above, sides of pronotum and each elytron clothed with short, recumbent, white pubescence.

Head convex, with a moderately deep depression extending from occiput to epistoma; surface rugose, depresion containing recumbent white pubescence; antennae extending to about middle of pronotum, serrate from the fifth joint.

Pronotum wider than long, wider at base than at apex, widest about middle; sides broadly rounded from apex toward base, sinuate near hind angles; marginal carina strongly sinuate, submarginal carina slightly sinuate, inferior near hind angles; the two carinae separated and not touching at any point; anterior margin broadly rounded, slightly sinuate; disk convex, with a slight indication of a median depression extending from scutellum to middle, lateral depressions well marked; prehumeral carinae strong, sinuate, enlarged anteriorly; surface transversely rugose, lateral depressions clothed with white recumbent pubescence. Scutellum distinctly transversely carinate, surface reticulate.

Elytra at base as wide as base of pronotum, constricted near middle, expanded behind middle; sides broadly sinuate, tips obliquely rounded; disk slightly flattened, sutural margins elevated in apical third; surface coarsely imbricate, clothed with short recumbent pubescence, longer white hairs of same type forming a dense white sutural vitta on each elytron.

Abdomen beneath finely, sparsely punctate, clothed with recumbent white pubescence which forms dense patches along the sides of the last three segments.

Prosternum broadly emargenately truncate. Tarsal claws cleft, the inner teeth broad and not turned inward, Pygidium carinate, carina not projecting.

Length 6.5 mm.; width 1.5 mm.

Described from a female labeled, White Mountains, ARIZONA, August 28, D. K. Duncan collector. *Type* in writer's collection.

According to Fisher's key,[3] this species would run to *A. felix* Horn. It is distinguished from this species by the pronotum being wider than long, and the surface being less rugose. The marginal and submarginal carinae are separated their entire distance in *A. arizonus,* whereas in *A. felix* Horn they are joined back of the middle.

Elaphidion (Anoplium) magnipunctata n. sp. (Cerambycidae.)

Moderately robust, shining dark brown in color, superficially resembling *A. imbelle* Lec.

Head with large punctures moderately spaced; eyes prominent, coarsely granulate; antennae extending to apices of elytra when laid back over dorsal surface, first three joints cylindrical, others somewhat flattened, second joint small, slightly longer than wide, third joint about four times length of second, fourth joint shorter than third, fifth joint longer than fourth, joints five to ten of about equal length, last joint longer than tenth, joints three to seven inclusive containing small spines on the inside which gradually decrease in size toward the outer joints; joints five to ten with prominent acute angles on the outside; antennae coarsely punctured, sparsely pubescent with short hairs, intermixed with a few long flying hairs.

Pronotum about as long as broad, widest in apical half, constricted at base and apex; sides broadly rounded in front, nearly parallel in middle, then subparallel to base; surface coarsely punctured, punctures becoming smaller and confluent on sides, an irregular median basal callous; pubescence sparse and inconspicuous. Scutellum small, densely pubescent.

Elytra with sides nearly parallel, broadly rounded toward tips, apices rounded to suture; surface covered with coarse,

[3] W. S. Fisher, U. S. Nat. Museum, Bull. 145, pp. 1-347, 1928.

widely separated punctures, which become obsolete toward apices; pubescence short and inconspicuous.

Ventral surface lighter in color than above; abdomen sparsely punctured with very fine punctures, a long hair arising from each depression.

Length 14 mm.; width 3.5 mm.

Described from a specimen labeled Grant County, NEW MEXICO, July 15, R. T. Kellogg collector. *Type* in writer's collection.

The Sexes of Harroweria gloriosa Hebard (Orthoptera; Tettigoniidae; Phaneropterinae).

By MORGAN HEBARD.

On September 9, 1932, an orchid plant (*Oncidium stipitsutum*) was shipped from the Canal Zone, Panama, to Hawaii, which plant was found to be bearing a number of eggs of a katydid. From these O. H. Swezey reared the larval and the adult specimens described below. The eggs hatched in Honolulu from March 20 to April 13, 1933, and adults matured from May 26 to July 2 of that year. Eight males and three females were reared to maturity, eight immatures being preserved to show the six instars through which the insect passes before the adult condition is reached. The species proves to be *Harroweria gloriosa* Hebard, of which a color figure of the unique female type was printed at the time of original description.[1]

The immatures in their earliest instar bear only one of the hairy sections of the antennae characteristic of the species. In the next instar two such sections are present and in the following instars three or four (as in the adults). The earliest instars are black with a small greenish white mark meso-dorsad on the caudal femora, but later all the markings shown by adults on the body and limbs appear.

The most interesting feature which the series reveals is the fact that the adult male has an entirely different tegminal and wing coloration from that of the adult female. Such sexual dimorphism is so very rare in the Orthoptera that any specialist

[1] Trans. Amer. Ent. Soc., LIII, p. 89, pl. XVIII, fig. 2 (1927).

might well have believed distinct species to be represented had the present series not been raised from the same lot of eggs. Unlike the female the male has the tegmina in proximal two-thirds with the half toward the sutural margin transparent pale brownish buff with cross-veinlets transparent greenish white. The tegmina elsewhere are as in the female, blackish brown with cross-veinlets pale brownish buff and two transverse bands of the latter distad, of which the first is broader but more broken than the apical band. Much more unlike the female are, however, the wings of the male, which have their entire proximal portion (including about two-fifths of their entire surface) transparent whitish (in four specimens immaculate, but in two with every minute cross-vein very finely margined on each side with brown). The wings elsewhere are exactly as in the female, brilliant metallic purple black with distal portion of anterior field strikingly white, blackish brown, pale brownish buff and again blackish brown.

The male cerci are simple, slender, elongate, weakly sigmoid and moderately flattened distad and terminate in a small triangular tooth. The male subgenital plate is slender distad, there with a deep and narrow U-emargination, the lateral apices so formed truncate and each bearing a small, simple, socketed style.

The genus is shown by these males to be, as we supposed, a member of the Group Ceraiae. The species is one of the most brilliantly colored and distinctively specialized of all katydids. The fact that only one adult specimen has ever been secured in collecting indicates that, like many katydids, the insect is nocturnal, probably hiding during the day in recesses in the thickest of tropical forest foliage.

Manual of Myiology, by Charles H. T. Townsend.

Recent advices from the author state that the size of the edition will be determined by the number of subscriptions received prior to March 1, 1934, as it is planned to issue Part I on that date. We are also advised that, in view of the action taken by the International Zoological Congress in Padua, the Meigen 1800 names will not be employed in the work. Address Charles Townsend & Filhos, Itaquaquecetuba, E.F.C.B., São Paulo, Brazil.

Two New Species of the Tachinid Genus Siphosturmiopsis with Key and Notes (Diptera).

By H. J. REINHARD, College Station, Texas.

Although I have discussed this genus recently (Proc. U. S. N. M. vol. 79, 1931, p. 8), the accumulation of two new forms described herein gives opportunity to present an amended key to the species and additional notes.

The genotype of *Siphosturmiopsis*, designated by Townsend in 1915, is *rafaeli*, new species, from Vera Cruz, Mexico, (Ins. Insc. Menst., vol. 3, p. 91). Townsend mentioned that the same species had been previously determined by Coquillett as *Brachycoma ruficauda* van der Wulp and referred to the genus *Atacta*. Wulp's type series, now in the British Museum of Natural History, was not seen by either author and until specimens are examined it appears expedient to consider the forms distinct.

The present genus has the essential characters of *Siphosturmia*, with the exception that the proboscis is short and rather stout, with the apical and basal segments about equal in length and together hardly totaling the height of the head. Townsend has pointed out that the epistomal characters of *Siphosturmiopsis* are the same as in *Masiphya*, which is true, and it may be added that the other cephalic characters are also very similar. However, the latter genus may at once be distinguished by the chitenized ovipositor in the female sex and by the peculiar structure of the male genitalia. There are other less important differences.

Key to Species of *Siphosturmiopsis*.

1. Four sternopleural bristles.....2.
   Three sternopleurals; middle tibiae with one stout bristle on the outer front side; palpi usually black; fourth abdominal segment red on apex (United States, widespread).
   phyciodis Coquillett.
2. Abdomen black on venter.....3.
   Abdomen entirely red on venter and on the sides above; antennae two-thirds the length of face, third segment red except on the anterior apical border; cheek clothed with coarse black hairs; palpi rather slender, brownish near base pale yellow apically (California)...*rufiventris*, new species.

3. Apex of abdomen black.....4.
Apex of abdomen yellow; parafacial at narrowest part approximating one-half the width of facial depression; ocellars small in female, hairlike in male (Mexico).
rafaeli Townsend.

4. Fourth abdominal segment obviously longer than the preceding one; lowermost frontal bristle situated at middle of parafacial on level with apex of second antennal segment; last three abdominal segments above shining black on posterior third or more, robust species 10 to 12 mm. in length (Texas) .....*melampyga* Reinhard.
Fourth abdominal segment barely exceeding the length of third; lowermost frontal bristle situated nearer to margin of eye; narrow hind margins of the intermediate abdominal segments subshining at most; arista thickened hardly to middle; moderate-sized species 7 or 8 mm. in length (New Mexico).....*oteroensis*, new species.

SIPHOSTURMIOPSIS RAFAELI Townsend

Siphosturmiopsis rafaeli Townsend, Ins. Insc. Menst., vol. 3, 1915, p. 91.—Reinhard, Proc. U. S. N. M., vol. 79, 1931, p. 8.

The type series, consisting of two females and one male, is in the U. S. National Museum. I do not know of any specimens in other collections. Townsend's description and the items mentioned by me in 1931 seem sufficient to identify the species.

Type locality: San Rafael, Vera Cruz, Mexico.

SIPHOSTURMIOPSIS MELAMPYGA Reinhard

Siphosturmiopsis melampyga Reinhard, Proc. U. S. N. M., vol. 79, 1931, p. 9.

I have given a full description of the species which is readily accessible. Known only in the female sex. The holotype is in the U. S. National Museum, and one paratype specimen is in my collection.

Type locality: College Station, Texas.

Siphosturmiopsis oteroensis, new species.

♀.—Front at extreme vertex 0.38 and 0.37 of the head width in the two specimens, widening uniformly downward; parafrontals gray pollinose, clothed with black hairs and bearing three or four weak bristles on widest part outside the main frontal rows; median stripe red, broad to triangle and at middle distinctly wider than one parafrontal; verticals two pairs, the

inner largest and reclinate, the outer ones divaricate; ocellar bristles well-developed; orbitals three pairs, the two anterior proclinate and the upper one reclinate; frontal bristles rather weak, the rows strongly diverging toward the eye beneath the antennae extending to level with apex of the second segment, uppermost bristle rather short and stout, reclinate; entire face including cheeks with dense cinereous pollen; parafacial narrowed downward, bare except a few delicate hairs just beneath the lowermost frontal bristles; face rather flat with the lower border slightly prominent, its ridges divergent below bearing a few bristles above the vibrissae, which are situated a little above the front edge of mouth; antennae a little shorter than the face, basal segments yellow, third black and a trifle less than twice the length of second; arista blackish, moderately thickened hardly to middle, penultimate segment but slightly longer than wide; cheek clothed with fine brownish-black hairs, about one-fifth the eye height; proboscis rather stout, obviously shorter than height of head, labella moderately enlarged; palpi yellow, somewhat thickened and strongly bowed upward beyond the middle; eyes bare; back of head gray pollinose, clothed with pale gray or whitish hairs.

Thorax black, gray pollinose; mesonotum marked with four or five poorly defined dark stripes which appear most distinct when viewed at a lateral angle; scutellum red, dusted with uniform gray pollen. Chaetotaxy: Humeral 4; posthumeral 3; notopleural 2; presutural 2; acrostichal 3, 3; dorsocentral 3, 4; intraalar 3; supraalar 3; postalar 2; pteropleural 1 or 2; sternopleural 2, 2; scutellum with three marginal, a rather long decussate apical and a wide-spaced discal pair, disk bearing numerous short erect bristly hairs which become larger toward the apex; postscutellum normally developed, dusted with gray pollen; calypters opaque, white.

Abdomen black first three segments reddish on the sides, with gray pollen which is rather thin beyond the middle of the second segment above, denser on the third and extending nearly to the hind margin; fourth segment conical and deflexed, wholly black, the pollen confined to the basal margin above and extending to the middle on the sides; first segment with a pair of small median marginal bristles; second with a rather short moderately stout pair; third segment bearing a marginal row of about ten; fourth segment with erect bristles and hairs over the entire upper surface which become weaker toward the tip; ovipositor retracted, not fitted for piercing.

Legs black; middle tibia with two or three large bristles on outer front side; hind tibia ciliated on outer posterior edge with one large bristle in the row beyond the middle; pulvilli short.

Wings grayish hyaline; veins bare except third which has two to four setules at the base; fourth vein with a rounded almost rectangular bend, without a stump or fold at latter; apical cross vein a trifle concave on its entire length; first posterior cell open far before the wing tip; hind cross vein joining fourth at less than one-third the distance from bend to small cross vein; costal spine vestigial.

Length, 7 to 8 mm. Male.—Unknown.

Two female specimens contributed by D. G. Hall, labeled Otero county, New Mexico, June 20, 1929. The *holotype* is deposited in the U. S. National Museum, and the *paratype* is in my collection.

The species resembles *melampyga* but is distinctly less robust in build. The principal differences are mentioned in the key. The host relationships are not known.

Siphosturmiopsis rufiventris, new species.

♀ Front at vertex 0.35 of the head width in the single specimen, gradually widening downward; parafrontals broad, with yellowish-gray pollen becoming paler below; frontal stripe reddish-brown, obviously narrower than one parafrontal on entire length; ocellars strong; verticals two pairs; orbitals one (upper) reclinate and two proclinate pairs; frontal bristles about seven in the row, lowermost bristle situated at middle of parafacial about on level with base of third antennal segment, the upper bristle largest and about the size of the reclinate orbital; parafacial bare, with dense silvery pollen, gradually narrower downward; face gray pollinose, rather flat with the front edge of mouth moderately protuberant; the ridges flattened bearing three or four bristles on lower extremity; vibrissae situated slightly above the mouth; antennae hardly exceeding two-thirds the length of face, red except the anterior apical border of third segment which is blackish, second segment fully one-half the length of third; arista black, moderately thickened on basal two-fifths and evenly tapering, penultimate segment short; proboscis shorter than height of head, the apical segment rather slender, labella not very large but apparently fleshy; palpi brown at base paler apically, hardly at all thickened beyond the middle and but weakly bowed upward; cheek gray pollinose, clothed with black hairs which are coarser below, about one-fifth the eye height; eyes bare; back of head gray pollinose and clothed with pale hairs.

Thorax black, gray pollinose; mesonotum marked with four black stripes in front and five behind the suture, the outer ones

broadest and extending almost to base of scutellum; the latter red sprinkled with changeable gray pollen. Chaetotaxy as in *otrocensis*, except that there are only two posthumerals developed and the apical scutellar bristles are decidedly smaller than the hindmost lateral pair; postcutellum normal, gray pollinose; calypters opaque, white, the rims faintly tawny.

Abdomen red with a blackish median stripe on the intermediate segments above; last three segments with gray pollen which becomes thinner beyond the basal third of the second segment above but extends rather uniformly to the apical third of the following one, the fourth pollinose on basal half; first segment with a pair of median marginals; second bearing one stout pair, a weaker one next to these and two at the sides; third with a marginal row of about 12; fourth with numerous bristles on the upper surface which become smaller toward the apex; genital opening moderately large, roundish, ovipositor retracted with a blunt tip.

Legs black; claws and pulvilli shorter than the apical tarsal segment; hind tibia unevenly ciliated; middle tibia with two stout bristles on the outer front side near the middle.

Wings gray hyaline; first vein bare, third with five coarse hairs at base; fourth vein with an obtuse stumpless bend, beyond straight and approaching costa in a diagonal direction; first posterior cell open far before the tip of wing; hind cross vein oblique to fourth which it joins much nearer the bend than small cross vein; costal spine small.

Length, 9 mm. Male.—Unknown.

Described from one female specimen received from C. H. Martin labeled, Monrovia Canyon, CALIFORNIA, July 26, 1931, (C. H. and D. Martin). The type is in my collection.

This species has the fourth abdominal segment less broadly truncate at the apex than the female of *phyciodis*. In the other known forms the anal segment of the female is conical or pointed at the tip.

SIPHOSTURMIOPSIS PHYCIODIS Coquillett

Sturmia phyciodis Coquillett, Revis. Tachin., 1897, p. 109.
Siphosturmiopsis phyciodis Coquillett, Reinhard, Proc. U. S. N. M., vol. 79, 1931, p. 11.

This common and well-known form requires no further description. The type series, consisting of one male and one female from Massachusetts and Maryland, is in the U. S. National Museum. The male specimen was reared October 7, 1889, from a species of *Phyciodes*.

List of the Titles of Periodicals and Serials Referred to by Numbers in Entomological Literature in Entomological News.

1. Transactions of The American Entomological Society. Philadelphia.
2. Entomologische Blätter, red. v. H. Eckstein etc. Berlin.
3. Annals of the Carnegie Museum. Pittsburgh, Pa.
4. Canadian Entomologist. London, Canada.
5. Pysche, A Journal of Entomology. Boston, Mass.
6. Journal of the New York Entomological Society. New York.
7. Annals of the Entomological Society of America. Columbus, Ohio.
8. Entomologists' Monthly Magazine. London.
9. The Entomologist. London.
10. Proceedings of the Ent. Soc. of Washington. Washington, D. C.
11. Deutsche entomologische Zeitschrift. Berlin.
12. Journal of Economic Entomology, Geneva, N. Y.
13. Journal of Entomology and Zoology. Claremont, Cal.
14. Entomologische Zeitschrift. Frankfurt a. M., Germany.
15. Natural History, American Museum of Natural History. New York.
16. American Journal of Science. New Haven, Conn.
17. Entomologische Rundschau. Stuttgart, Germany.
18. Internationale entomologische Zeitschrift. Guben, Germany.
19. Bulletin of the Brooklyn Entomological Society. Brooklyn, N. Y.
20. Societas entomologica. Stuttgart, Germany.
21. The Entomologists' Record and Journal of Variation. London.
22. Bulletin of Entomological Research. London.
23. Bollettino del Laboratorio di Zoologia generale e agraria della R. Scuola superiore d'Agricultura in Portici. Italy.
24. Annales de la société entomologique de France. Paris.
25. Bulletin de la société entomologique de France. Paris.
26. Entomologischer Anzeiger, hersg. Adolf Hoffmann. Wien, Austria.
27. Bolletino della Società Entomologica. Genova, Italy.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. The Maine Naturalist. Thornaston, Maine.
31. Nature. London.
32. Boletim do Museu Nacional do Rio de Janiero. Brazil.
33. Bull. et Annales de la Société entomologique de Belgique. Bruxelles.
34. Zoologischer Anzeiger, hrsg. v. E. Korschelt. Leipzig.
35. The Annals of Applied Biology. Cambridge, England.
36. Transactions of the Entomological Society of London. England.
37. Proceedings of the Hawaiian Entomological Society. Honolulu.
38. Bull. of the Southern California Academy of Sciences. Los Angeles.
39. The Florida Entomologist. Gainesville, Fla.
40. American Museum Novitates. New York.
41. Mitteilungen der schweiz. ent. Gesellschaft. Schaffhausen, Switzerland.
42. The Journal of Experimental Zoology. Philadelphia.
43. Ohio Journal of Sciences. Columbus, Ohio.
44. Revista chileña de historia natural. Valparaiso, Chile.
45. Zeitschrift für wissenschaftliche Insektenbiologie. Berlin.
46. Zeitschrift für Morphologie und Ökologie der Tiere. Berlin.
47. Journal of Agricultural Research. Washington, D. C.
48. Wiener entomologische Zeitung. Wien, Austria.
49. Entomologische Mitteilungen. Berlin.
50. Proceedings of the U. S. National Museum. Washington, D. C.
51. Notulae entomologicae, ed. Soc. ent. Helsingfors. Helsingfors, Finland.
52. Archiv für Naturgeschichte, hrsg. v. E. Strand. Berlin.

53. Quarterly Journal of Microscopical Science. London.
54. Annales de Parasitologie Humaine et Comparée. Paris.
55. Pan-Pacific Entomologist. San Francisco, Cal.
56. "Konowia". Zeit. für systematische Insektenkunde. Wien, Austria.
57. La Feuille des Naturalistes. Paris.
58. Entomologische Berichten. Nederlandsche ent. Ver. Amsterdam.
59. Encyclopédie entomologique, ed. P. Lechevalier. Paris.
60. Stettiner entomologische Zeitung. Stettin, Germany.
61. Proceedings of the California Academy of Sciences. San Francisco.
62. Bulletin of the American Museum of Natural History. New York.
63. Deutsche entomologische Zeitschrift "Iris". Berlin.
64. Zeitschrift des österr. entomologen-Vereines. Wien.
65. Zeitschrift für angewandte Entomologie, hrsg. K. Escherich. Berlin.
66. Report of the Proceedings of the Entomological Meeting. Pusa, India.
67. University of California Publications, Entomology. Berkeley, Cal.
68. Science. New York.
69. Comptes rendus hebdoma. des séances de l'Académie des sciences. Paris.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie, Leningrad, USSR.
73. Quarterly Review of Biology. Baltimore, Maryland.
74. Sbornik entomolog. národniho musea v Praze. Prague, Czechoslavokia.
75. Annals and Magazine of Natural History. London.
76. The Scientific Monthly. New York.
77. Comptes rendus heb. des séances et mémo. de la soc. de biologie. Paris.
78. Bulletin Biologique de la France et de la Belgique. Paris.
79. Koleopterologische Rundschau. Wien.
80. Lepidopterologische Rundschau, hrsg. Adolf Hoffmann. Wien.
81. Folia myrmecol. et termitol. hrsg. Anton Krausse. Bernau bei Berlin.
82. Bulletin, Division of the Natural History Survey. Urbana, Illinois.
83. Arkiv för zoologie, K. Svenska Vetenskapsakademien i. Stockholm.
84. Ecology. Brooklyn.
85. Genetics. Princeton, New Jersey.
86. Zoologica, New York Zoological Society. New York.
87. Archiv für Entwicklungs mechanik der Organ., hrsg. v. Roux. Leipzig.
88. Die Naturwissenschaften, hrsg. A. Berliner. Berlin.
89. Zoologische Jahrbücher, hrsg. v. Spengel. Jena, Germany.
90. The American Naturalist. Garrison-on-Hudson, New York.
91. Journal of the Washington Academy of Sciences. Washington, D. C.
92. Biological Bulletin. Wood's Hole, Massachusetts.
93. Proceedings of the Zoological Society of London. England.
94. Zeitschrift für wissenschaftliche Zoologie. Leipzig.
95. Proceedings of the Biological Soc. of Washington, Washington, D. C.
96. La Cellule. Lierre, Belgium.
97. Biologisches Zentralblatt. Leipzig.
98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.
100. Bulletin Intern., Académie Polonaise des Sci. et des Lett. Cracovie, Poland.
101. Tijdschrift voor entomologie, Nederlandsche Entomol. Ver., Amsterdam.
102. Entomologiske Meddelelser, Entomologisk Forening, Copenhagen.
103. Journal of the Kansas Entomological Society, Lawrence, Kansas.
104. Revista de la Sociedad entomologica Argentina, Buenos Aires.
105. Revista Entomologia, São Paulo, Brazil.
106. Anales Sociedad Cientifica Argentina, Buenos Aires.
107. Stylops: a Journal of Taxonomic Entomology, London.
108. Revista, Col. Nac. Vicente Rocafuerte, Guayaquil.

New Name of Cypselopteryx T. T. (Dipt.: Anthomyiidae.)

On pages 15 and 16 of the *Supplementa Entomologica,* volume XIV (1926), I published the above generic name, which I find to be preoccupied and for which the new name **Cypselodopteryx** is herewith proposed.

Genotype, *Cypselopteryx mima* T. T., l.c., from Kurintji Peak, Sumatra.

The fly in question is one of the aberrant anthomyioids with hypopleural bristles.—CHARLES H. T. TOWNSEND.

Pelecinus polyturator Male (Hymen.: Pelecinidae).

On Sept. 3, 1933, while collecting coleoptera a half mile up Darby Creek from the Sproul Road at a woods called "The Hunt," Delaware County, Pennsylvania, I captured a male *Pelecinus polyturator.* It was on a leaf of *Eupatorium urticaefolium* near the water.—MARK ROBINSON, 1533 So 56th St., Philadelphia.

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The **figures within brackets** [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual **volume,** and in some cases the part, heft, &c. the latter **within** ( ) follows; **then** the pagination follows the **colon** :

All continued papers, with few exceptions, are recorded only at their first installments.

*Papers containing new forms or names have an * preceding the author's name.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

☞ *Note the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

GENERAL.—Anon.—Nachschrift der redaktion. [17] 50: 274-280. **Bishopp, F. C.**—Medical entomology—Its field and function. [10] 35: 144-158. ***Carpenter, F. M.**—The lower Permian insects of Kansas. Part 6. [Pro. Amer. Acad. Arts & Sci.] 68: 411-508, ill. **Criddle, N.**—Obituary. By Gibson & Crawford. [4] 65: 193-200, ill. Obituary.

By H. Lloyd. [Can. Field Nat.] 47: 145-147, ill. **Smith, R. C.**—Publications of the late Professor James Walker McColloch (1889-1929). [103] 6: 137-142.

ANATOMY, PHYSIOLOGY, ETC.—Bliss and Gill—The effects of freezing on the larvae of Aedes aegypti. [Jour. Tenn. Ac. Sci.] 8: 418-423. **de Boissezon, P.**—De l'utilisation des proteines et due fer d'origine vegetale dans la maturation des oeufs chez Culex pipiens. [77] 114: 487-489. **Brittain & Newton.**—A study in the relative constancy of hive bees and wild bees in pollen gathering. [Canadian Jour. Res.] 9: 334-349. **Chudoba, S.**—Sur la relation entre les résidus fusoriaux et les fibrilles plasmatiques d'une certaine catégorie dans la spermatogenèse chez Tenebrio molitor. [77] 114: 343-346, ill. **Fernando, W.**—The development and homologies of the mouthparts of the head-louse. [53] 76: 231-241, ill. **Greb, R. J.**—Production of Gynandromorphs in Habrobracon. [Pro. Penna. Acad. Sci.] 7: 117-118. **Hecht & Wald.**—The influence of intensity on the visual functions of Drosophila. [Proc. Nac. Acad. Sci. U. S. A.] 19: 964-972, ill. **Horn, C. A.**—Mitochondria of insect intestinal tract. [Pro. Penna. Acad. Sci.] 7: 75-78, ill. **Miller, F. W.**—Variations in the wing venation of Aphis feminea (Aphididae). [Pro. Penna. Acad. Sci.] 7: 69-71. **Oka & Furukawa.**—Regulationsvermögen der Libelliennymphen. Eine vorläufige mitteilung. [Proc. Imp. Acad., Tokyo] 9: 124-127, ill. **Pilawski, S.**—Les structures fibrillaires osmiophiles dans la spermatogenèse chez Cicindela hybrida. [77] 114: 346-348, ill. **Pyenson, L.**—The shielding effects of various materials when insects are exposed to the lines of force in a high frequency electrostatic field. [6] 41: 241-264. **Speicher, B. R.**—The demonstration of muscle contraction in insects. [Pro. Pennsylvania Acad. Sci.] 6: 152-153, ill. **Speicher & Miller.**—The mechanics of antennal movement in Habrobracon. [Pro. Penna. Acad. Sci.] 7: 66-69, ill. **Whiting, A. R.**—Variegated eyes in Habrobracon. How we draw Habrobracon. [Pro. Penna. Acad. Sci.] 7: 118; 111-119. **Whiting, P. W.**—Selective fertilization and sex-determination in Hymenoptera. [68] 78: 537-538. **Whiting, P. W.**—The parasitic wasp, Habrobracon juglandis as laboratory class material. Reproductive reactions of Gynandromorphs. [Pro. Penna. Acad. Sci.] 7: 116; 117. **Wigglesworth, V. B.**—The physiology of the cuticle and of ecdysis in Rhodnius prolixus; with special reference to the function of the oenocytes and of the dermal glands. [53] 76: 269-318, ill.

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SPECIAL NOTICES.—The Fauna of British India.—Diptera IV. Culicidae. Anophelini. By S. R. Christophers. Students of this group should be acquainted with this work.

BIBLIOGRAPHY OF AUSTRALIAN ENTOMOLOGY 1775-1930, with biographical notes on authors and collectors, BY ANTHONY MUSGRAVE, Entomologist of The Australian Museum at Sydney.—This publication of the Royal Zoological Society of New South Wales bears the date of September, 1932. It consists of 380 large octavo pages crowded with thousands of entries, and an almost incredible amount of valuable information, clearly printed, with every citation beginning a new line and therefore

easy to find and very easy to read. Fully 10,000 titles are given in full with not only the customary details of date, volume and pagination but also information about the plates which so often, for some incomprehensible reason, is omitted. The author has sought to include all works in which any Australian Insects are described; in cases where a single, or only a few, Australian species are involved, the names of these species are given, with page references.

One finds of course extended bibliographies of the principal students of Australian Insects, such as Blackburn, Broun, Carter, Dodd, Ferguson, Froggatt, Hardy, Lea, Lower, Meyrick, Maskell, Pascoe, Sloane, Taylor, Turner, etc. But this information is supplemented with other facts giving the important general works of such authorities as Bigot, Butler, Candeze, Dalla Torre, Gemminger and Harold, Hampson, Lacordaire, Macquart, Marseul, Sherborn, Walker, as well as Genera Insectorum, the various British Museum Catalogues, etc.

There are brief biographies of both writers and collectors, with references to their sources: there is information about the various scientific expeditions which have visited Australia, and concerning the entomological collections and types contained in the various Australian Museums.

One biographical error has crept in. We are certainly glad that our good friend Dr. Walther Horn, Director of the Deutsches Entomologisches Institut, still lives and continues to help many friends with his unfailing store of knowledge and efficient aid of all kinds.

For the student, for the librarian, for the book-dealer, and most certainly for every entomologist interested in any group or family of Insects, this up to date work is an invaluable book of reference.

One wonders at its low price. My own copy, purchased from Angus and Robertson, Ltd. of Sydney, cost less than three dollars, postage included .

JOHN D. SHERMAN, JR.

SHIRAKI, TOKUICHI: A SYSTEMATIC STUDY OF TRYPETIDAE IN THE JAPANESE EMPIRE. Memoirs of the Faculty of Science and Agriculture, Taihoku Imperial University, Vol. VIII. 509 pp., 92 textfigs., 14 col. pl.—165 species, placed in 75 genera, are treated in this volume; of these species, about half are described as new. Keys to all genera and species are included, and detailed descriptions of both structure and pattern are given, supplemented by numerous figures in the text, and

fourteen beautiful colored plates. The classification adopted is in the main that of Hendel's 1927 paper on the palaearctic although numerous departures are noticeable. The family is divided into three subfamilies—Dacinae, Trypetinae and Tephritinae—but no tribal names are used. Perhaps the most notable of the novelties is a new genus and species with stalked eyes, similar to *Pelmatops*.

The introductory section on the structure of these flies is the most comprehensive that has so far appeared; the morphological terminology seems entirely in accord with that used by most present day Dipterists. It is notable that abbreviations are rarely used in the text, except for wing veins. The early stages are not considered in any detail, although the host of each species is mentioned, where known.

In scope and careful workmanship this volume by Shiraki surely ranks with the papers by Hendel on South America and Europe, and by Bezzi on India and Africa. The East Indies, Australia and North America are now left as the only large areas whose Trypetid faunas have not been monographed. It is only after this faunal work has been done that we can hope, by a process of synthesis, to build a rational classification for the whole family: toward this task, Dr. Shiraki has made a generous contribution.—MARSTON BATES.

OBITUARY.

WILLIAM SHERMAN WRIGHT,[1] curator of insects and county supervisor of nature study of the Natural History Museum, San Diego, died of a brief illness at Laguna Beach, California, enroute home, on July 8, 1933. He was born at Hardin,[2] Illinois, April 23, 1866. He prepared for educational work and graduated from the San Diego Normal School in 1902 and spent a year at Columbia University, 1917. He taught in Nebraska, 1889-1894, and in California, 1902-1928, and received his present appointment in 1923. The study of entomology was pursued as a hobby and he also spent three days a week for one year working on the Lepidoptera in the American Museum of Natural History as an assistant in the department of entomology. Collecting trips were made along the Mexican border in 1906; to Ensenado, Mexico in 1925; Laguna Mountains, 1926; Yosemite Valley, 1920, 1921; Lake Tahoe region, 1926; Grand Canyon, Arizona, 1925. He was specially interested in Lepidoptera and amassed a large collection of 40,000 specimens which was donated to the San Diego Society of

Natural History in 1924. It now aggregates 100,000 specimens of all orders.

He has published a number of valuable papers in various periodicals, the more important ones being:

Notes on the life history of *Datana robusta* Strecker, Jour. N. Y. Entom. Soc., vol. 16, pp. 1-6 (1908).

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E. O. Essig.

The number of Entomological News for December, 1933, was mailed at the Philadelphia Post Office on December 27, 1933.

[1] Gunder, J. E., Ent. News, vol. 40, pp. 34-35, portrait, (Plate II) February, 1929.
In Memoriam, Bul. So. California Acad. Sci., vol. 32, p. 129, 1933.

[2] Mr. Wright furnished much of these data in 1930.

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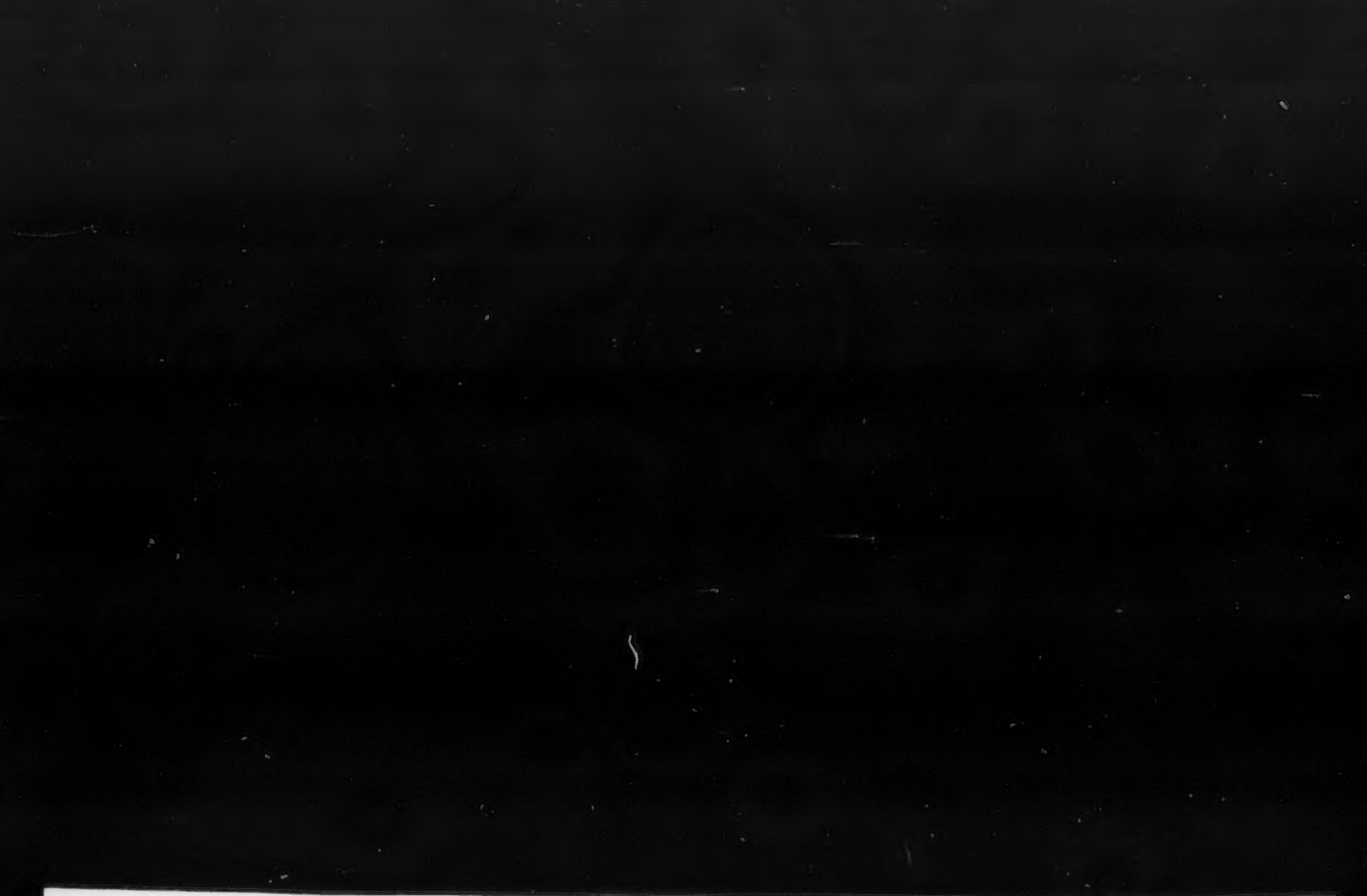

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